

IDAHO DEPARTMENT OF FISH & GAME

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EAST FORK OF ROCK CREEK STREAM FLOW STUDY (Power County)



By

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INTRODUCTION

East Fork of Rock Creek originates in the Deep Creek Mountains in Power County, Idaho (Figure 1). The stream flows in a westerly direction for a distance of approximately 11 miles, forming Rock Creek at its confluence with South Fork of Rock Creek, northwest of Rockland. Springs in the upper reaches influence the flow and the temperature regime of the stream.

East Fork Rock Creek is heavily used by local residents as it is the only trout stream of small size in Power County. The upper six miles are located primarily on public land, and are planted annually with hatchery rainbow trout by the Department of Fish and Game. In 1979, 2,950 hatchery trout were planted in this section at three times during the general fishing season. Electrofishing results in 1978 and 1979 by Department personnel indicated that 400 wild trout per mile inhabited the lower five miles, and 650 wild trout per mile were in the upper section. These fish ranged in lengths of 2.6 inches to 9.6 inches with a mean length of 6.0 inches. Game fish populations are comprised of rainbow trout and cutthroat trout.

OBJECTIVE

The objective of this study was to determine instream flow values necessary to maintain viable populations of rainbow and cutthroat trout in East Fork of Rock Creek from the U.S.G.S. gage station (No. 130776) downstream to the Power County bridge, 1.5 miles east of Rockland.

TECHNIQUES

Rainbow trout was selected as the species of concern and adult rearing was designated as the critical life history phase. A site typifying adult rainbow trout rearing habitat was selected in the study section.

The methodology employed to determine stream flow requirements utilizes the relationship of trout habitat requirements to hydraulic parameters

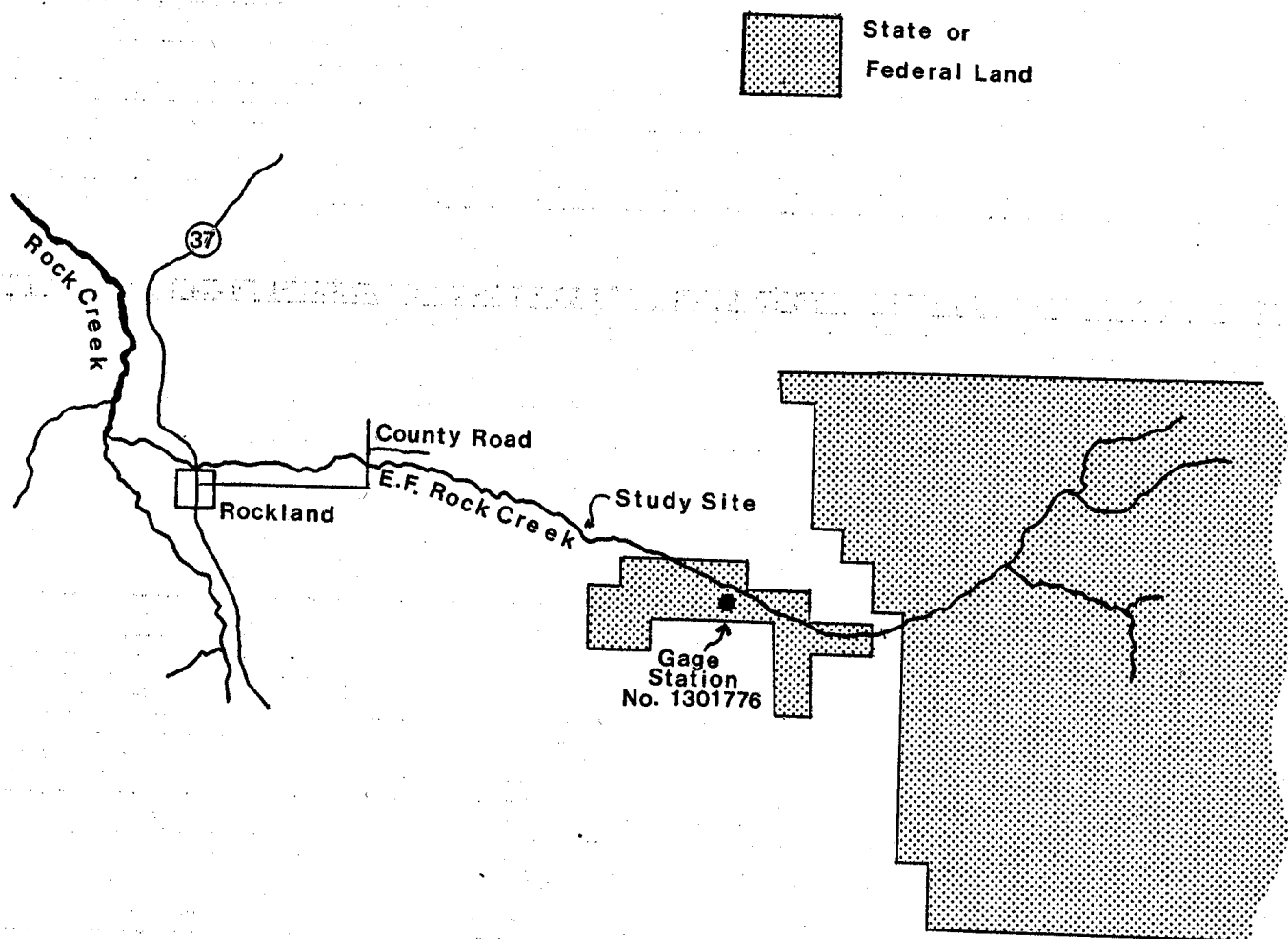


Figure 1. Location of stream flow study on East Fork of Rock Creek.

(depth and velocity) with changes in discharges.

At the study site, four transects were established, and on each transect depth and velocity were measured for at least 15 stations. These procedures were in accordance with standard U.S. Geological Survey methods for discharge measurements.

Distances between transects were measured along the thalweg, and relative water surface elevations were determined by standard surveying techniques.

Hydraulic data were collected for a single discharge, and information required over a range of flows were predicted utilizing the U.S. Water and Power Resources Service water surface profile computer program (PSEUDO).

The predicted parameters were correlated with known rainbow trout habitat criteria as described by the U.S. Fish and Wildlife Service Instream Flow Group (Bovee and Cochnauer, 1977; Bovee, 1978).

For each of several flows between 0 and 30 cfs, each transect was given a weighted habitat unit value. These values are determined by multiplying the width of each segment (designated as the station of depth and velocity measurement) by the weighted value corresponding to water depth (Figure 2). The total weighted habitat unit value for each transect is the total of the segments on that transect.

The weighted habitat unit values are plotted against the corresponding discharge resulting in a curve as depicted in Figure 3. Starting at zero discharge, the weighted habitat unit as the study site increases rapidly for small increases in discharge to an inflection point where habitat units increase slowly. At this inflection point, the greatest amount of rearing habitat is available for least amount of flow, and is selected as the minimum rearing maintenance flow.

RAINBOW TROUT

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ADULT

78/01/24.

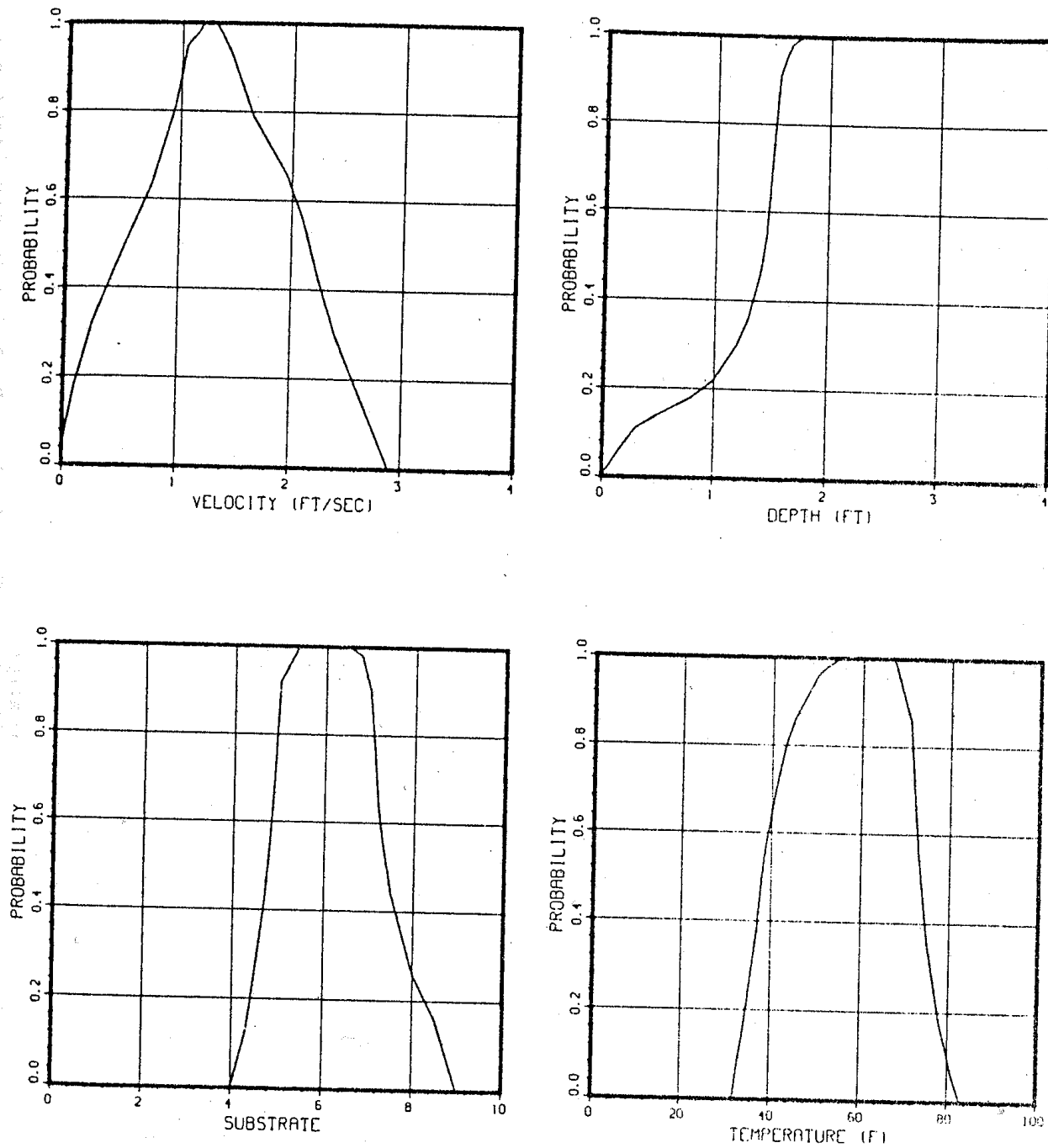


Figure 2. Rainbow trout adult rearing probability curves.

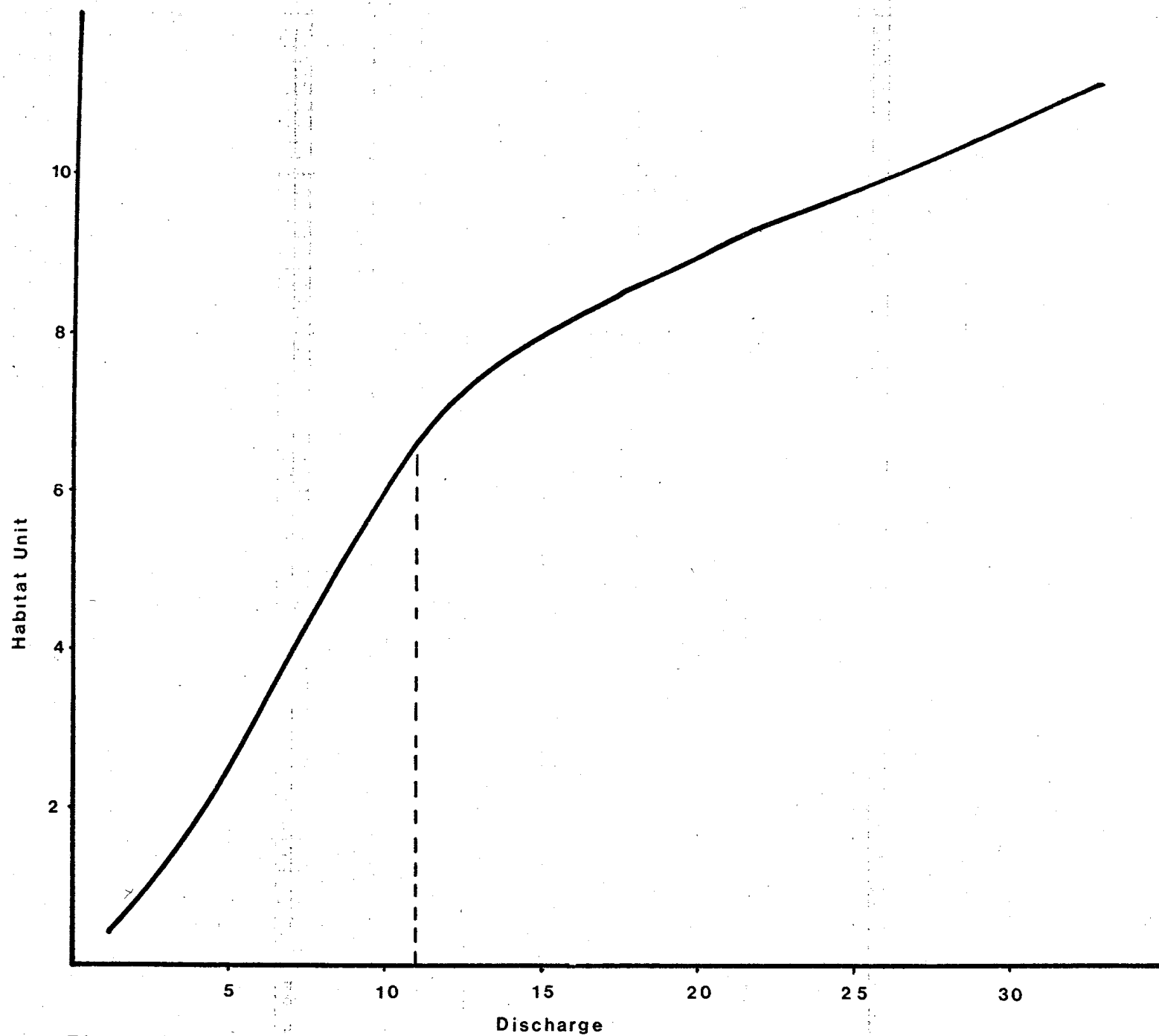


Figure 3. Adult rainbow trout rearing curve East Fork of Rock Creek near Rockland.

FINDINGS

The results of correlating habitat units with corresponding discharges are shown in Figure 3. The desired instream flow value for adult rainbow trout in East Fork of Rock Creek is 11.0 cfs.

LITERATURE CITED

- Bovee, Ken D. and Tim Cochnauer. 1977. Development and evaluation of weighted Criteria, Probability-of-use curves for instream flow assessments; Fisheries Instream Flow Information Paper No. 3. Cooperative Instream Flow Service Group, For Collins, Colarado. 49 p.
- Bovee, Ken D. 1978. Probability-of-use criteria for the Family Salmonidae. Instream Flow Information Paper No. 4. Cooperative Instream Flow Service Group, Fort Collins, Colorado. 88 p.